

USSN 09/596,402
Group Art Unit: 3762
Docket No. 151P09399US01

AMENDMENTS TO THE CLAIMS

What is claimed is:

1. (currently amended) An implantable medical device having an efficient recharging coil, comprising:

a housing having an interior cavity, a proximal face, and an electrical feedthrough;

electronics carried in the housing interior cavity and configured to perform a medical therapy;

a rechargeable power source carried in the housing interior cavity and coupled to the electronics;

a secondary recharging coil coupled to the electronics and rechargeable power source, the secondary recharging coil having a distal side and having an axis; and,

a magnetic shield placed on the distal side of the recharging coil to improve recharging efficiency, the shield being approximately perpendicular to ~~an~~ the axis of the secondary recharging coil and the shield being located between the recharging coil and the electronics.
2. (original) The implantable medical device as in claim 1 wherein the magnetic shield improves recharging efficiency by improving electromagnetic coupling between the secondary recharging coil and a primary recharging coil.
3. (previously presented) The implantable medical device as in claim 2 wherein the magnetic shield improves the recharging efficiency by increasing flux lines that couple with the recharging coil from the primary recharging coil.
4. (previously presented) The implantable medical device as in claim 2 wherein the magnetic shield improves the electromagnetic coupling to greater than 10 percent coupling efficiency at about one centimeter.

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5. (previously presented) The implantable medical device as in claim 1 wherein recharging efficiency is improved by decreasing flux lines emanating from a primary coil that couple with the housing.
6. (previously presented) The implantable medical device as in claim 5 wherein the magnetic shield provides improved recharging efficiency through reduced eddy currents in the housing.
7. (previously presented) The implantable medical device as in claim 6 wherein the magnetic shield provides reduced medical device temperature rise during recharging of the power source through reduced currents in the housing.
8. (previously presented) The implantable medical device as in claim 7 wherein the implantable medical device temperature rise during recharging is less than two degrees Celsius.
9. (canceled)
10. (original) The implantable medical device as in claim 1 wherein the magnetic shield is a material with high magnetic permeability.
11. (original) The implantable medical device as in claim 10 wherein the magnetic shield is selected from the group consisting of: amorphous metal film, amorphous metal wire, and magnetic alloy.
12. (original) The implantable medical device as in claim 1 wherein the magnetic shield includes eddy cuts to reduce eddy current flow through the magnetic shield.
13. (original) The implantable medical device as in claim 1 wherein the magnetic shield has a central opening.
14. (previously presented) The implantable medical device as in claim 1, wherein the magnetic shield comprises a first magnetic shield and a second

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magnetic shield and a first insulator placed between the first magnetic shield and the second magnetic shield.

15. (previously presented) The implantable medical device as in claim 14, wherein the magnetic shield further comprises a third magnetic shield and a second insulator placed between the second magnetic shield and the third magnetic shield.
16. (previously presented) The implantable medical device as in claim 15 wherein the first insulator and a second insulator are selected from the group consisting of: plastic, mylar, and tape.
17. (previously presented) The implantable medical device as in claim 1 wherein the secondary recharging coil is carried on the proximal face of the housing and the magnetic shield is placed between the recharging coil and the proximal face of the housing.
18. (currently amended) An implantable medical device having an efficient recharging coil, comprising:
 - a housing having an interior cavity, a proximal face, and an electrical feedthrough;
 - electronics carried in the housing interior cavity and configured to perform a medical therapy;
 - a rechargeable power source carried in the housing interior cavity and coupled to the electronics;
 - a secondary recharging coil coupled to the electronics and rechargeable power source, the secondary recharging coil having a distal side and an axis; and
 - a magnetic shield placed on the distal side of the recharging coil to improve recharging efficiency, the shield being approximately perpendicular to ~~an~~ the axis

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of the secondary recharging coil and the shield being located between the recharging coil and the electronics;

wherein the secondary recharging coil is an external secondary recharging coil located remotely away from the housing.

19. (currently amended) An implantable medical device having an efficient recharging coil, comprising:

a housing having an interior cavity, a proximal face, and an electrical feedthrough;

electronics carried in the housing interior cavity and configured to perform a medical therapy;

a rechargeable power source carried in the housing interior cavity and coupled to the electronics;

a secondary recharging coil coupled to the electronics and rechargeable power source, the secondary recharging coil having a distal side and an axis; and

a magnetic shield placed on the distal side of the recharging coil to improve recharging efficiency, the shield being approximately perpendicular to ~~an~~ the axis of the secondary recharging coil and the shield being located between the recharging coil and the electronics;

wherein the recharging coil is located in the housing interior cavity.

20. (currently amended) An implantable medical device having an efficient recharging coil, comprising:

a housing having an interior cavity, a proximal face, and an electrical feedthrough;

electronics carried in the housing interior cavity and configured to perform a medical therapy;

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a rechargeable power source carried in the housing interior cavity and coupled to the electronics;

a secondary recharging coil coupled to the electronics and rechargeable power source, the secondary recharging coil having a distal side and an axis; and

a magnetic shield placed on the distal side of the recharging coil to improve recharging efficiency, the shield being approximately perpendicular to ~~an~~ the axis of the secondary recharging coil and the shield being located between the recharging coil and the electronics;

wherein the housing is an electric conductor.

21. (currently amended) An implantable medical device having an efficient recharging coil, comprising:

a housing having an interior cavity, a proximal face, and an electrical feedthrough;

electronics carried in the housing interior cavity and configured to perform a medical therapy;

a rechargeable power source carried in the housing interior cavity and coupled to the electronics;

a secondary recharging coil coupled to the electronics and rechargeable power source, the secondary recharging coil having a distal side and an axis; and

a magnetic shield placed on the distal side of the recharging coil to improve recharging efficiency, the shield being approximately perpendicular to ~~an~~ the axis of the secondary recharging coil and the shield being located between the recharging coil and the electronics;

wherein the magnetic shield comprises a first magnetic shield and a second magnetic shield and a first insulator placed between the first magnetic shield and the second magnetic shield;

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wherein the magnetic shield further comprises a third magnetic shield and a second insulator placed between the second magnetic shield and the third magnetic shield; and

wherein the housing is selected from the group consisting of: titanium, ceramic, and epoxy.

22. (original) The implantable medical device as in claim 1 wherein the medical device is selected from the group consisting of: neuro stimulators, pacemakers, defibrillators, drug delivery pumps, diagnostic recorders, and cochlear implants.